AUTHOR INDEX

A

Armstrong, C. M. *See* Gilly and Armstrong.
—. *See* Matteson and Armstrong.

B

Besharse, J. C., Dunis, D. A., and Burnside, B. Effects of cyclic adenosine 3',5'-monophosphate on photoreceptor disc shedding and retinomotor movement. Inhibition of rod shedding and stimulation of cone elongation. 775.
Bezanilla, F., Taylor, R. E., and Fernández, J. M. Distribution and kinetics of membrane dielectric polarization. I. Long-term inactivation of gating currents. 21.
—. *See* Fernández, Bezanilla, and Taylor.
Birdsall, N. J. M. *See* Nargeot, Lester, Birdsall, Stockton, Wassermann, and Erlanger.
Bjerrum, P. J. *See* Wieth and Bjerrum.
—, *See* Wieth, Bjerrum, and Borders.
Blaustein, M. P. *See* Nachshen and Blaustein.
Borders, C. L., Jr. *See* Wieth, Bjerrum, and Borders.
Böttger, B. *See* Gamow and Böttger.
Bownds, D. M. *See* Hermolin, Karell, Hamm, and Bownds.
Brahm, J. Diffusional water permeability of human erythrocytes and their ghosts. 791.
Brandt, P. W., Cox, R. N., Kawai, M., and Robinson, T. Regulation of tension in skinned muscle fibers. Effect of cross-bridge kinetics on apparent Ca^{2+} sensitivity. 997.
Burnside, B., Evans, M., Fletcher, R. T., and Chader, G. J. Induction of dark-adaptive retinomotor movement (cell elongation) in teleost retinal cones by cyclic adenosine 3',5'-monophosphate. 759.
—. *See* Besharse, Dunis, and Burnside.

C

Cahalan, M. D., and Hall, J. E. Alamethicin channels incorporated into frog node of Ranvier. Calcium-induced inactivation and membrane surface charges. 411.
—. *See* Hall and Cahalan.
Chader, G. J. *See* Burnside, Evans, Fletcher, and Chader.
Chalmers, B. *See* Van Bruggen, Chalmers, and Muller.
Cornelius, F. Tonic contraction and the control of relaxation in a chemically skinned molluscan smooth muscle. 821.
Coronado, R., and Miller, C. Conduction and block by organic cations in a K^+-selective channel from sarcoplasmic reticulum incorporated into planar phospholipid bilayers. 529.
Cox, R. N. *See* Brandt, Cox, Kawai, and Robinson.
Crnjar, R. M. *See* Dethier and Crnjar.
Cronin, T. W., and Goldsmith, T. H. Photosensitivity spectrum of crayfish rhodopsin measured using fluorescence of metarhodopsin. 313.
Crow, M. T., and Kushmerick, M. J. Chemical energetics of slow- and fast-twitch muscles of the mouse. 147.
Cukierman, S., and Paes de Carvalho, A. Frequency-dependent excitability on "membrane" slow responses of rabbit left atrial trabeculae in the presence of Ba^{2+} and high K^+. 1017.

D

De Weer, P. *See* Simchowitz, Spilberg, and De Weer.
Dethier, V. G., and Crnjar, R. M. Candidate codes in the gustatory system of caterpillars. 549.
Dodge, F. A. *See* Wong, Knight, and Dodge.
Dubois, J. M., and Schneider, M. F. Kinetics of intramembrane charge movement and sodium current in frog node of Ranvier. 571.
Dulhunty, A. F. Effects of membrane potential on mechanical activation in skeletal muscle. 233.
Dunham, P. B. *See* Tucker, Smalley, Ellory, and Dunham.
Dunis, D. A. *See* Besharse, Dunis, and Burnside.
DuPre, A. *See* Grinstein, DuPre, and Rothstein.

E

Eastwood, A. B. *See* Salviati, Sorenson, and Eastwood.
Eisenberg, B. R., and Eisenberg, R. S. The T-SR junction in contracting single skeletal muscle fibers. 1.
Eisenberg, R. S. *See* Eisenberg and Eisenberg.
Ellory, J. C. *See* Tucker, Smalley, Ellory, and Dunham.
—, **and Willis, J. C.** Kinetics of the sodium pump in red cells of different temperature sensitivity. 1115.
Erlanger, B. F. *See* Nargeot, Lester, Birdsall, Stockton, Wassermann, and Erlanger.
Evans, M. *See* Burnside, Evans, Fletcher, and Chader.

F

Fain, G. L. *See* Lisman, Fain, and O'Day.
Fernández, J. M., Bezanilla, F., and Taylor, R. E. Distribution and kinetics of membrane dielectric polarization. II. Frequency domain studies of gating currents. 41.
—. *See* Bezanilla, Taylor, and Fernández.

Fletcher, R. T. *See* Burnside, Evans, Fletcher, and Chader.

G

Gamow, R. I., and Böttger, B. Avoidance and rheotropic responses in *Phycomyces*. Evidence for an "avoidance gas" mechanism. 835.
Gilly, W. F., and Armstrong, C. M. Divalent cations and the activation kinetics of potassium channels in squid giant axons. 965.
—, **and Armstrong, C. M.** Slowing of sodium channel opening kinetics of squid axon by extracellular zinc. 935.
Goldring, M. *See* O'Day, Lisman, and Goldring.
Goldsmith, T. H. *See* Cronin and Goldsmith.
Grinstein, S., DuPre, A., and Rothstein, A. Volume regulation by human lymphocytes. Role of calcium. 849.
Gunn, R. B. *See* Milanick and Gunn.
Gutknecht, J. *See* Walter, Hastings, and Gutknecht.

H

Hagiwara, S. *See* Moody and Hagiwara.
Hall, J. E., and Cahalan, M. D. Calcium-induced inactivation of alamethicin in asymmetric lipid bilayers. 387.
—. *See* Cahalan and Hall.
Hamm, H. E. *See* Hermolin, Karell, Hamm, and Bownds.
Hastings, D. *See* Walter, Hastings, and Gutknecht.
Hermolin, J., Karell, M. A., Hamm, H. E., and Bownds, D. M. Calcium and cyclic GMP regulation of light-sensitive protein phosphorylation in frog photoreceptor membranes. 633.
Horn, R. *See* Patlak and Horn.

J

Jennings, M. L. Stoichiometry of a half-turnover of band 3, the chloride transport protein of human erythrocytes. 169.
Josephson, I., and Sperelakis, N. On the ionic mechanism underlying adrenergic-cholinergic antagonism in ventricular muscle. 69.

K

Karell, M. A. *See* Hermolin, Karell, Hamm, and Bownds.
Kass, R. S., Scheuer, T., and Malloy, K. J. Block of outward current in cardiac Purkinje fibers by injection of quaternary ammonium ions. 1041.
Kawai, M. *See* Brandt, Cox, Kawai, and Robinson.
Knight, B. W. *See* Wong, Knight, and Dodge.
Kujiraoka, T. *See* Toyoda and Kujiraoka.
Kushmerick, M. J. *See* Crow and Kushmerick.

L

Lechene, C. *See* Warner and Lechene.
Lester, H. A. *See* Nargeot, Lester, Birdsall, Stockton, Wassermann, and Erlanger.
Lisman, J. E., Fain, G. L., and O'Day, P. M. Voltage-dependent conductances in *Limulus* ventral photoreceptors. 187.
—. *See* O'Day, Lisman, and Goldring.

M

Malloy, K. J. *See* Kass, Scheuer, and Malloy.
Matteson, D. R., and Armstrong, C. M. Evidence for a population of sleepy sodium channels in squid axon at low temperature. 739.
Medeiros, J. A. *See* Zamir and Medeiros.
Milanick, M. A., and Gunn, R. B. Proton-sulfate cotransport. Mechanism of H^+ and sulfate addition to the chloride transporter of human red blood cells. 87.
Miller, C. *Bis*-quaternary ammonium blockers as structural probes of the sarcoplasmic reticulum K^+ channel. 869.
—. *See* Coronado and Miller.
Minke, B. Light-induced reduction in excitation efficiency in the *trp* mutant of *Drosophila*. 361.
Moody, W. J., and Hagiwara, S. Block of inward rectification by intracellular H^+ in immature oocytes of the starfish *Mediaster aequalis*. 1.
Muller, M. *See* Van Bruggen, Chalmers, and Muller.

N

Nachshen, D. A., and Blaustein, M. P. Influx of calcium, strontium, and barium in presynaptic nerve endings. 1065.
Nargeot, J., Lester, H. A., Birdsall, N. J. M., Stockton, J., Wassermann, N. H., and Erlanger, B. F. A photoisomerizable muscarinic antagonist. Studies of binding and of conductance relaxations in frog heart. 657.

O

O'Day, P. M., Lisman, J. E., and Goldring, M. Functional significance of voltage-dependent conductances in *Limulus* ventral photoreceptors. 211.
—. *See* Lisman, Fain, and O'Day.

P

Paes de Carvalho, A. *See* Cukierman and Paes de Carvalho.
Palade, P., and Vergara, J. Arsenazo III and antipyrylazo

III calcium transients in single skeletal muscle fibers. 679.

Patlak, J., and Horn, R. Effect of *N*-bromoacetamide on single sodium channel currents in excised membrane patches. 333.

Persson, B.-E., and Spring, K. R. Gallbladder epithelial cell hydraulic water permeability and volume regulation. 481.

Peterson, J. W., III. Rate-limiting steps in the tension development of freeze-glycerinated vascular smooth muscle. 437.

R

Robinson, T. *See* Brandt, Cox, Kawai, and Robinson.

Rothstein, A. *See* Grinstein, DuPre, and Rothstein.

S

Salviati, G., Sorenson, M. M., and Eastwood, A. B. Calcium accumulation by the sarcoplasmic reticulum in two populations of chemically skinned human muscle fibers. Effects of calcium and cyclic AMP. 603.

Scheuer, T. *See* Kass, Scheuer, and Malloy.

Schneider, M. F. *See* Dubois and Schneider.

Simchowitz, L., Spilberg, I., and De Weer, P. Sodium and potassium fluxes and membrane potential of human neutrophils. Evidence for an electrogenic sodium pump. 453.

Smalley, C. E. *See* Tucker, Smalley, Ellory, and Dunham.

Sorenson, M. M. *See* Salviati, Sorenson, and Eastwood.

Sperelakis, N. *See* Josephson and Sperelakis.

Spilberg, I. *See* Simchowitz, Spilberg, and De Weer.

Spring, K. R. *See* Persson and Spring.

Stockton, J. *See* Nargeot, Lester, Birdsall, Stockton, Wassermann, and Erlanger.

T

Taylor, R. E. *See* Bezanilla, Taylor, and Fernández.

—. *See* Fernández, Bezanilla, and Taylor.

Toyoda, J.-I., and Kujiraoka, T. Analyses of bipolar cell responses elicited by polarization of horizontal cells. 131.

Tucker, E. M., Smalley, C. E., Ellory, J. C., and Dunham, P. B. The transition from HK to LK phenotype in the red cells of newborn genetically LK lambs. 893.

V

Van Bruggen, J. T., Chalmers, B., and Muller, M. Effects of solvent and solute drag on transmembrane diffusion. 507.

Vergara, J. *See* Palade and Vergara.

W

Walter, A., Hastings, D., and Gutknecht, J. Weak acid permeability through lipid bilayer membranes. Role of chemical reactions in the unstirred layer. 917.

Warner, R. R., and Lechene, C. Analysis of standing droplets in rat proximal tubules. 709.

Wassermann, N. H. *See* Nargeot, Lester, Birdsall, Stockton, Wassermann, and Erlanger.

Wieth, J. O., and Bjerrum, P. J. Titration of transport and modifier sites in the red cell anion transport system. 253.

—, **Bjerrum, P. J., and Borders, C. L., Jr.** Irreversible inactivation of red cell chloride exchange with phenylglyoxal, an arginine-specific reagent. 283.

Willis, J. C. *See* Ellory and Willis.

Wong, F., Knight, B. W., and Dodge, F. A. Adapting bump model for ventral photoreceptors of *Limulus*. 1089.

Z

Zamir, M., and Medeiros, J. A. Arterial branching in man and monkey. 353.

THE JOURNAL OF GENERAL PHYSIOLOGY

FOUNDED BY JACQUES LOEB

Honorary Editors

JOHN H. NORTHROP
VINCENT ALLFREY
L. R. BLINKS
A. K. SOLOMON

Editor

PAUL F. CRANEFIELD

Editorial Board

PAUL R. ADAMS
OLAF ANDERSEN
CLAY M. ARMSTRONG
FRANCIS D. CARLSON
C. M. CONNELLY
PAUL DE WEER
ROBERT S. EISENBERG
ALEXANDRE FABIATO
ARTHUR L. FINN
DAVID C. GADSBY
S. HAGIWARA
BERTIL HILLE
EARL HOMSHER
PHILIP A. KNAUF
L. J. MULLINS
JOHN C. PARKER
CARL PFAFFMANN
FLOYD RATLIFF
JAMES A. SCHAFER
STANLEY G. SCHULTZ
ROBERT SHAPLEY
CHARLES F. STEVENS
ROGER C. THOMAS
ANNEMARIE WEBER
JENS OTTO WIETH
VICTOR J. WILSON

VOLUME 79 · THE JOURNAL OF GENERAL PHYSIOLOGY IS
THE OFFICIAL ORGAN OF THE SOCIETY OF GENERAL PHYSIOLOGISTS
AND IS EDITED IN COOPERATION WITH THE SOCIETY
MAUREEN M. BODO *Copyediting and Production*
THE ROCKEFELLER UNIVERSITY PRESS · NEW YORK 1982

COPYRIGHT © 1982 BY THE ROCKEFELLER UNIVERSITY PRESS

CONTENTS

VOLUME 79 • NUMBER 1 • JANUARY 1982

1 BRENDA R. EISENBERG and ROBERT S. EISENBERG. The T-SR junction in contracting single skeletal muscle fibers

21 FRANCISCO BEZANILLA, ROBERT E. TAYLOR, and JULIO M. FERNÁNDEZ. Distribution and kinetics of membrane dielectric polarization. I. Long-term inactivation of gating currents

41 JULIO M. FERNÁNDEZ, FRANCISCO BEZANILLA, and ROBERT E. TAYLOR. Distribution and kinetics of membrane dielectric polarization. II. Frequency domain studies of gating currents

69 IRA JOSEPHSON and NICK SPERELAKIS. On the ionic mechanism underlying adrenergic-cholinergic antagonism in ventricular muscle

87 M. A. MILANICK and R. B. GUNN. Proton-sulfate co-transport. Mechanism of H^+ and sulfate addition to the chloride transporter of human red blood cells

115 W. J. MOODY and S. HAGIWARA. Block of inward rectification by intracellular H^+ in immature oocytes of the starfish *Mediaster aequalis*

131 JUN-ICHI TOYODA and TORU KUJIRAOKA. Analyses of bipolar cell responses elicited by polarization of horizontal cells

147 MICHAEL T. CROW and MARTIN J. KUSHMERICK. Chemical energetics of slow- and fast-twitch muscles of the mouse

VOLUME 79 • NUMBER 2 • FEBRUARY 1982

169 MICHAEL L. JENNINGS. Stoichiometry of a half-turnover of band 3, the chloride transport protein of human erythrocytes

187 JOHN E. LISMAN, GORDON L. FAIN, and PETER M. O'DAY. Voltage-dependent conductances in *Limulus* ventral photoreceptors

211 PETER M. O'DAY, JOHN E. LISMAN, and MARC GOLDRING. Functional significance of voltage-dependent conductances in *Limulus* ventral photoreceptors

233 ANGELA F. DULHUNTY. Effects of membrane potential on mechanical activation in skeletal muscle

253 J. O. WIETH and P. J. BJERRUM. Titration of transport and modifier sites in the red cell anion transport system

283 J. O. WIETH, P. J. BJERRUM, and C. L. BORDERS, JR. Irreversible inactivation of red cell chloride exchange with phenylglyoxal, an arginine-specific reagent

313 THOMAS W. CRONIN and TIMOTHY H. GOLDSMITH. Photosensitivity spectrum of crayfish rhodopsin measured using fluorescence of metarhodopsin

VOLUME 79 • NUMBER 3 • MARCH 1982

333 JOSEPH PATLAK and RICHARD HORN. Effect of *N*-bromoacetamide on single sodium channel currents in excised membrane patches

353 M. ZAMIR and J. A. MEDEIROS. Arterial branching in man and monkey

361 BARUCH MINKE. Light-induced reduction in excitation efficiency in the *trp* mutant of *Drosophila*

387 JAMES E. HALL and MICHAEL D. CAHALAN. Calcium-induced inactivation of alamethicin in asymmetric lipid bilayers

411 MICHAEL D. CAHALAN and JAMES E. HALL. Alamethicin channels incorporated into frog node of Ranvier. Calcium-induced inactivation and membrane surface charges

437 JOHN W. PETERSON III. Rate-limiting steps in the tension development of freeze-glycerinated vascular smooth muscle

453 LOUIS SIMCHOWITZ, ISAIAS SPILBERG, and PAUL DE WEER. Sodium and potassium fluxes and membrane potential of human neutrophils. Evidence for an electrogenic sodium pump

481 BO-ERIC PERSSON and KENNETH R. SPRING. Gallbladder epithelial cell hydraulic water permeability and volume regulation

507 J. T. VAN BRUGGEN, BRENT CHALMERS, and MERTIE MULLER. Effects of solvent and solute drag on transmembrane diffusion

VOLUME 79 • NUMBER 4 • APRIL 1982

529 ROBERTO CORONADO and CHRISTOPHER MILLER. Conduction and block by organic cations in a K^+-selective channel from sarcoplasmic reticulum incorporated into planar phospholipid bilayers

549 V. G. DETHIER and R. M. CRNJAR. Candidate codes in the gustatory system of caterpillars

571 JEAN MARC DUBOIS and MARTIN F. SCHNEIDER. Kinetics of intramembrane charge movement and sodium current in frog node of Ranvier

603 G. SALVIATI, M. M. SORENSON, and A. B. EASTWOOD. Calcium accumulation by the sarcoplasmic reticulum in two populations of chemically skinned human muscle fibers. Effects of calcium and cyclic AMP

633 JOSEPH HERMOLIN, MARC A. KARELL, HEIDI E. HAMM, and M. DERIC BOWNDS. Calcium and cyclic GMP regulation of light-sensitive protein phosphorylation in frog photoreceptor membranes

657 JOËL NARGEOT, HENRY A. LESTER, NIGEL J. M. BIRDSALL, JANE STOCKTON, NORBERT H. WASSERMANN, and BERNARD F. ERLANGER. A photoisomerizable muscarinic antagonist. Studies of binding and of conductance relaxations in frog heart

679 PHILIP PALADE and JULIO VERGARA. Arsenazo III and antipyrylazo III calcium transients in single skeletal muscle fibers

709 R. R. WARNER and C. LECHENE. Analysis of standing droplets in rat proximal tubules

VOLUME 79 • NUMBER 5 • MAY 1982

739 DONALD R. MATTESON and CLAY M. ARMSTRONG. Evidence for a population of sleepy sodium channels in squid axon at low temperature

759 BETH BURNSIDE, MICHAEL EVANS, R. THEODORE FLETCHER, and G. J. CHADER. Induction of dark-adaptive retinomotor movement (cell elongation) in teleost retinal cones by cyclic adenosine 3′,5′-monophosphate

775 JOSEPH C. BESHARSE, DAIGA A. DUNIS, and BETH BURNSIDE. Effects of cyclic adenosine 3′,5′-monophosphate on photoreceptor disc shedding and retinomotor movement. Inhibition of rod shedding and stimulation of cone elongation

791 J. BRAHM. Diffusional water permeability of human erythrocytes and their ghosts

821 FLEMMING CORNELIUS. Tonic contraction and the control of relaxation in a chemically skinned molluscan smooth muscle

835 R. IGOR GAMOW and BARBEL BÖTTGER. Avoidance and rheotropic responses in *Phycomyces*. Evidence for an "avoidance gas" mechanism

849 SERGIO GRINSTEIN, ANN DUPRE, and ASER ROTHSTEIN. Volume regulation by human lymphocytes. Role of calcium

869 CHRISTOPHER MILLER. *Bis*-quaternary ammonium blockers as structural probes of the sarcoplasmic reticulum K^+ channel

893 E. M. TUCKER, C. E. SMALLEY, J. C. ELLORY, and P. B. DUNHAM. The transition from HK to LK phenotype in the red cells of newborn genetically LK lambs

917 ANNE WALTER, DAVID HASTINGS, and JOHN GUTKNECHT. Weak acid permeability through lipid bilayer membranes. Role of chemical reactions in the unstirred layer

VOLUME 79 • NUMBER 6 • JUNE 1982

935 WM. FRANK GILLY and CLAY M. ARMSTRONG. Slowing of sodium channel opening kinetics of squid axon by extracellular zinc

965 WM. FRANK GILLY and CLAY M. ARMSTRONG. Divalent cations and the activation kinetics of potassium channels in squid giant axons

997 P. W. BRANDT, R. N. COX, M. KAWAI, and T. ROBINSON. Regulation of tension in skinned muscle fibers. Effect of cross-bridge kinetics on apparent Ca^{2+} sensitivity

1017 Samuel Cukierman and Antonio Paes de Carvalho. Frequency-dependent excitability on "membrane" slow responses of rabbit left atrial trabeculae in the presence of Ba^{2+} and high K^+

1041 Robert S. Kass, Todd Scheuer, and Kevin J. Malloy. Block of outward current in cardiac Purkinje fibers by injection of quaternary ammonium ions

1065 D. A. Nachshen and M. P. Blaustein. Influx of calcium, strontium, and barium in presynaptic nerve endings

1089 Fulton Wong, Bruce W. Knight, and Frederick A. Dodge. Adapting bump model for ventral photoreceptors of *Limulus*

1115 J. C. Ellory and J. C. Willis. Kinetics of the sodium pump in red cells of different temperature sensitivity

1131 Author Index to Volume 79